

**CYST NEMATODE ON COLE CROPS  
BECKY B. WESTERDAHL  
EXTENSION NEMATOLOGIST /  
PROFESSOR OF NEMATOLOGY  
UC DAVIS**

**14th ANNUAL  
DESERT CROPS  
WORKSHOP  
DECEMBER 3,  
2003**

**WWW ADDRESS:  
[ucdnema.ucdavis.edu](http://ucdnema.ucdavis.edu)**



1991 California growers' economic losses from nematode damage on the nine crops with greatest historic usage of 1,3-D = \$106.8 million (Landels, 1992)

Millions of Dollars Lost  
**ROOT-KNOT NEMATODE (RKN)**

Tomatoes	13.4
Cotton	9.8
Sweet potatoes	7.5
Potatoes	0.4
Carrots	15.1

**SUGARBEET CYST & (RKN)**

Broccoli	15.7
Cauliflower	7.9
Sugar beets	6.1
Brussel sprouts	0.7

**SUGARBEET CYST NEMATODE ON SUGARBEET**



COMPOUND

VOLATILITY  
HIGH

\$/ACRE

FUMIGANTS

Methyl Bromide - Tarped	5	1,200
- Nontarped	5	280-400
Chloropicrin	7	1,200
1,3-Dichloropropene(1,3-D.Telonell)	30	100-500
<hr/>		
Methyl isothiocyanate ( Metam Sodium, Vapam, Basamid)	500	150-400

ORGANOPHOSPHATES & CARBAMATES

Ethoprop(Mocap)	100,000	50-250
Carbofuran(Furadan)	1,000,000	
Aldicarb(Temik)	1,500,000	
Fenamiphos(Nemacur)	10,000,000	
Oxamyl(Vydate)	100,000,000	
	LOW	

# **METHYL BROMIDE - ALTERNATIVE FUMIGANTS:**

**1,3 - DICHLOROPROPENE**

**TELONE II, TELONE C35**

**INLINE (EMULSIFIABLE)**

**CHLOROPICRIN (PIC EC)**

**SODIUM TETRATHIOCARBONATE (ENZONE)**

**METAM SODIUM**

**DAZOMET (BASAMID)**

**OZONE GAS**

**\*METHYL IODIDE (IODOMETHANE)**

**\*PROPARGYL BROMIDE**

**COMBINATIONS OF  
THE ABOVE**

**\*NOT REGISTERED**

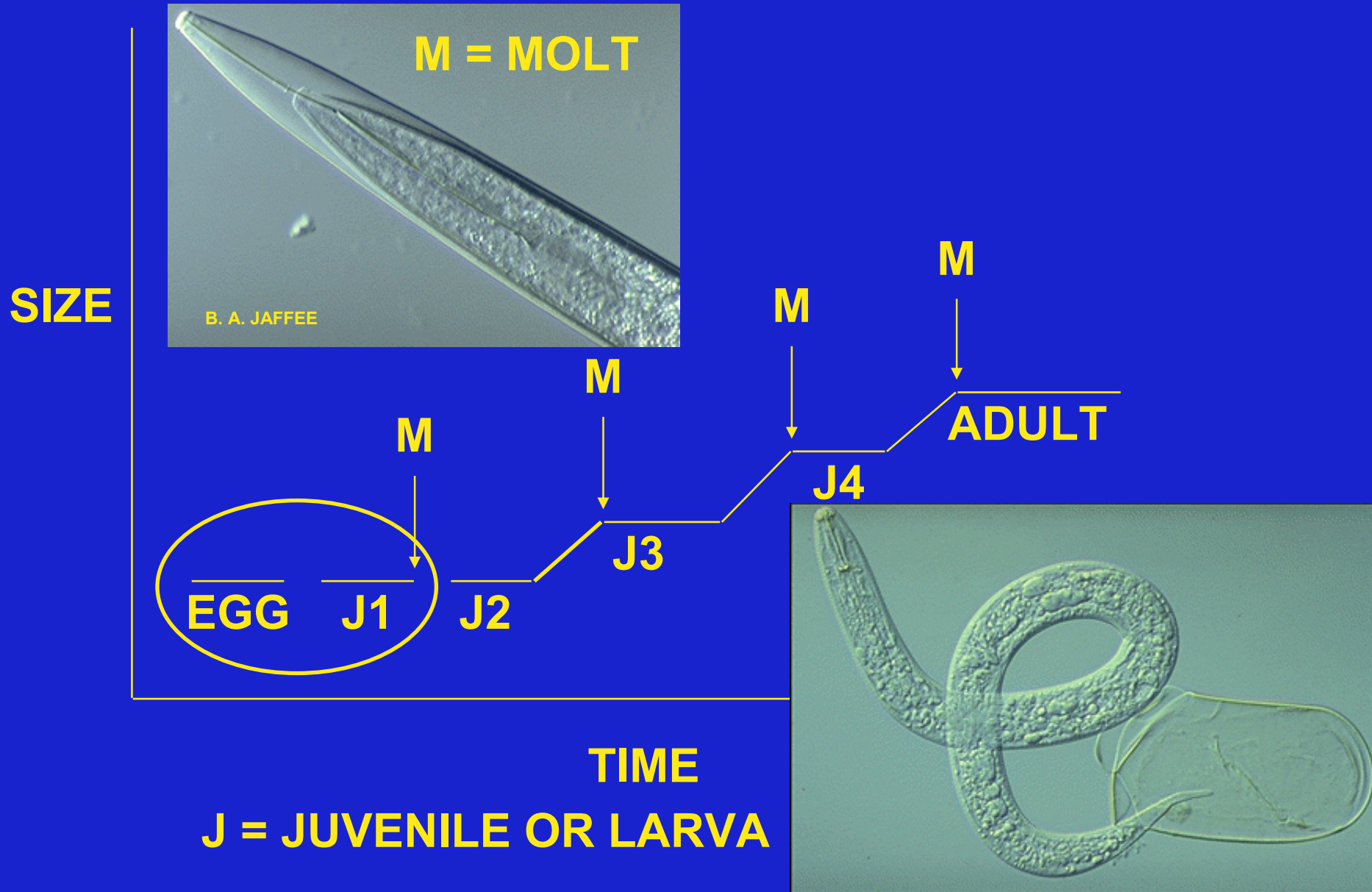


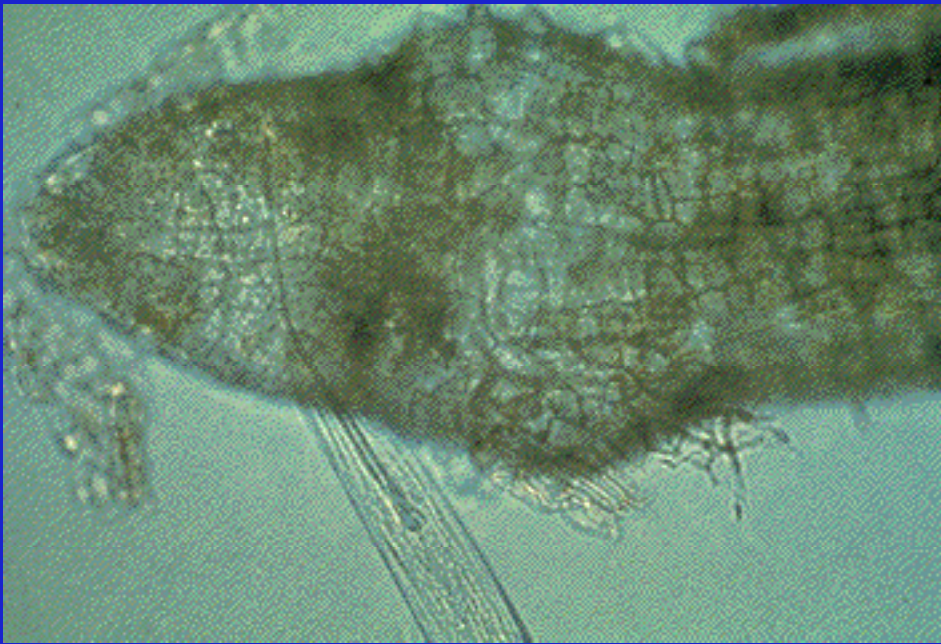
DISTRIBUTION OF SUGAR BEET  
CYST NEMATODE:





# LIFE CYCLE OF A TYPICAL PLANT PARASITIC NEMATODE:

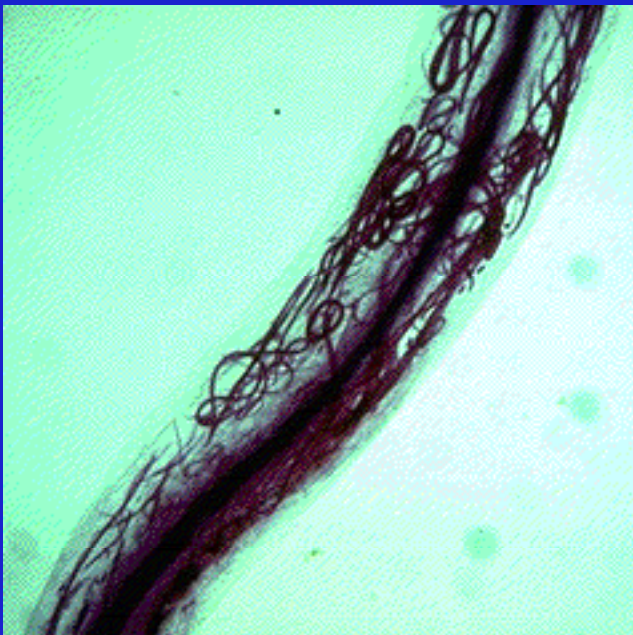




**ECTOPARASITE**



**SEDENTARY  
ENDOPARASITE**



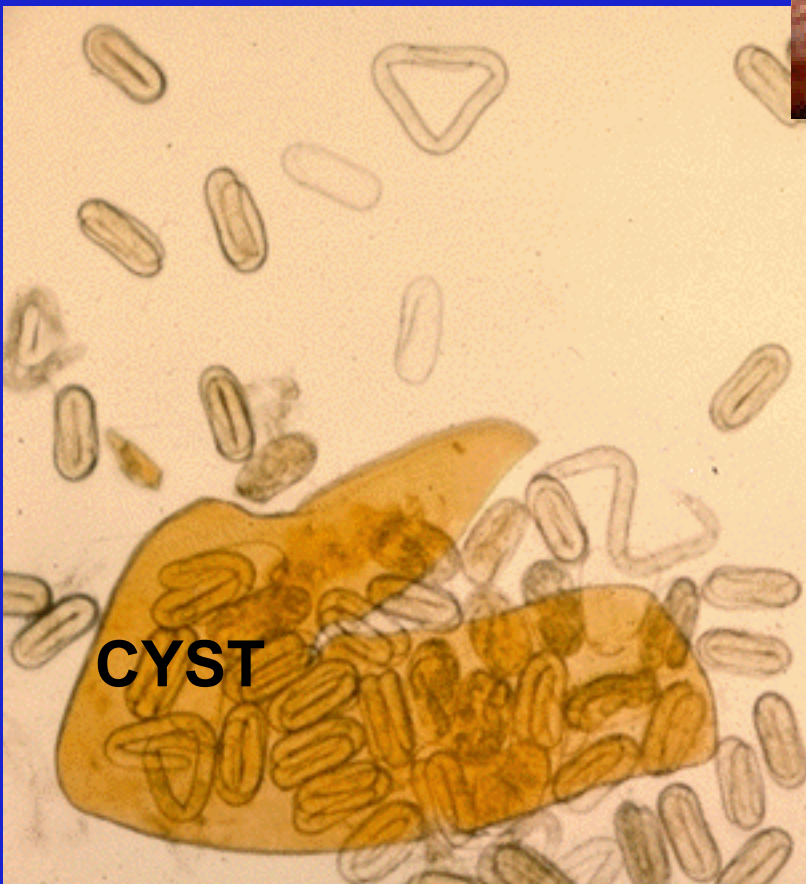
**MIGRATORY  
ENDOPARASITE**



**HETERODERA SCHACHTII**  
**(SUGARBEET CYST**  
**NEMATODE)**

**ADULT FEMALE (CYST)**

**JUVENILE**  
**HATCHING**  
**FROM EGG**



QuickTime™ and a  
Photo CD Decompressor  
needed to use this picture



# INFLUENCE OF TEMPERATURE ON NEMATODES:

	MINIMUM FOR INFECTION	REPRO- DUCTION	OPTIMUM FOR ACTIVITY
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## ROOT KNOT

### *MELOIDOGYNE* SP.

*M. CHITWOODI*

(COLUMBIA)

45F

(6C)

45F

(6C)

68-77F

(20-25C)

*M. HAPLA*

(NORTHERN)

54F

(12C)

54F

(12C)

77-86F

(25-30C)

*M. INCOGNITA*

(SOUTHERN)

65F

(18C)

50F

(10C)

76-90F

(25-32C)

## SUGARBEET CYST

*HETERODERA*

*SCHACHTII*

50F

(10C)

46F

(8C)

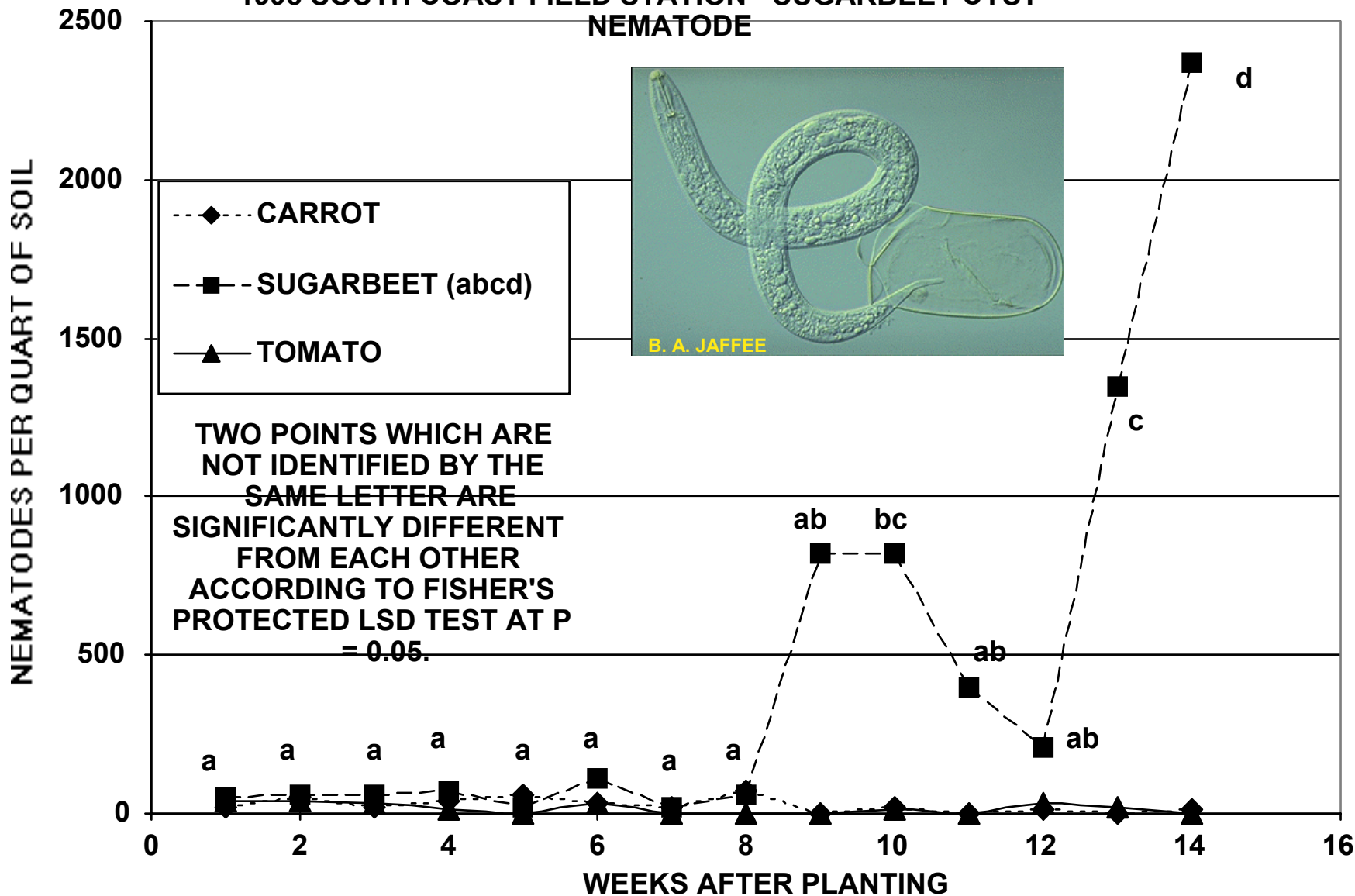
70-81F

(21-27C)

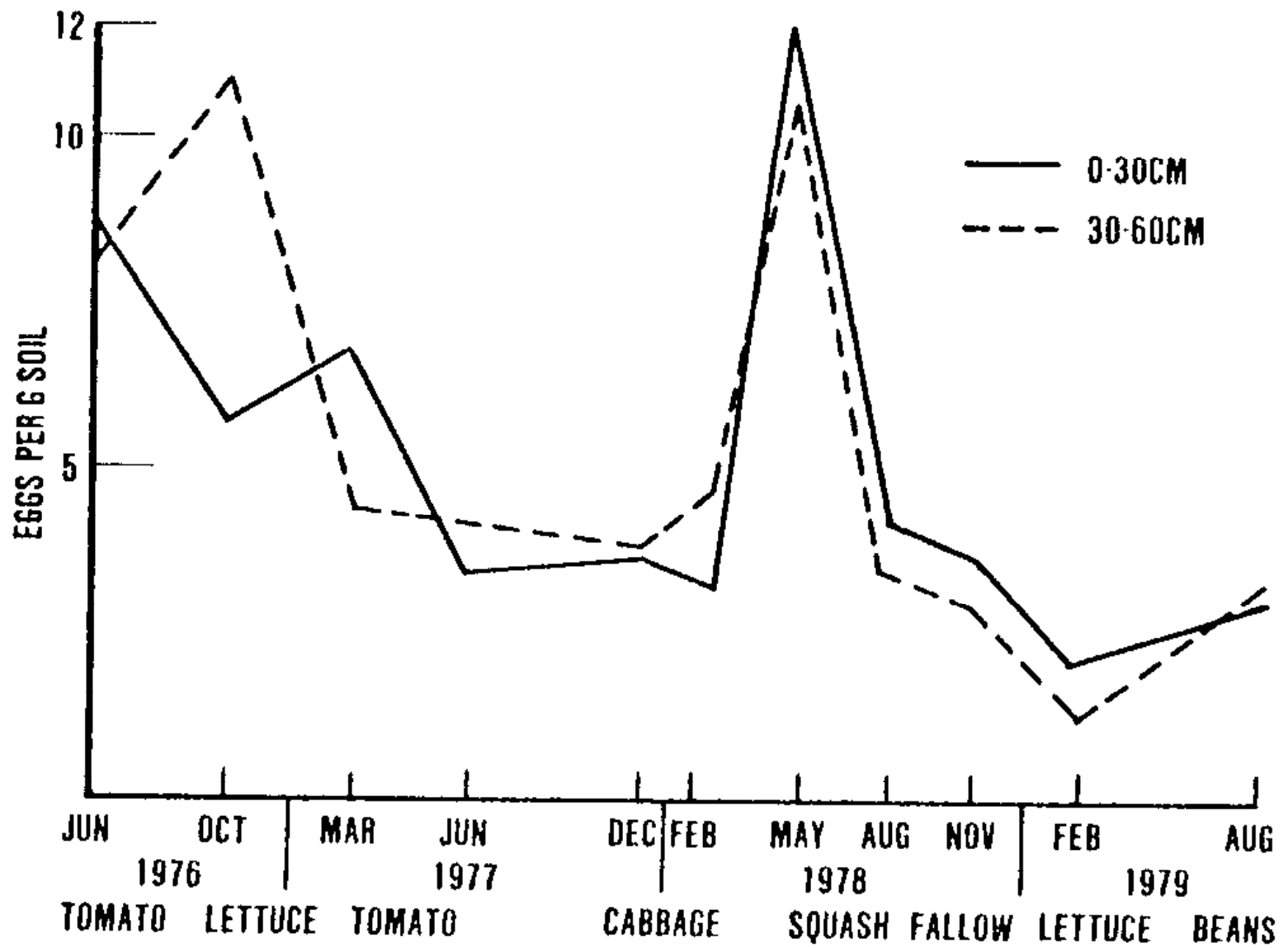
## NEEDLE *LONGIDORUS AFRICANUS*

DAMAGE TO LETTUCE SEEDLINGS IS MINIMAL AT  
SOILTEMPERATURES LESS THAN 22C (72F)

# 1998 SOUTH COAST FIELD STATION - SUGARBEET CYST NEMATODE



# EFFECT OF CROP ROTATION ON POPULATION DENSITY OF SUGARBEET CYST NEMATODE:





**BROCCOLI -  
SUGARBEET CYST NEMATODE  
(HETERODERA SCHACHTII)**





# **DiTERA**

**VALENT (ABBOTT LABORATORIES)**

**KILLED MICROBIAL**

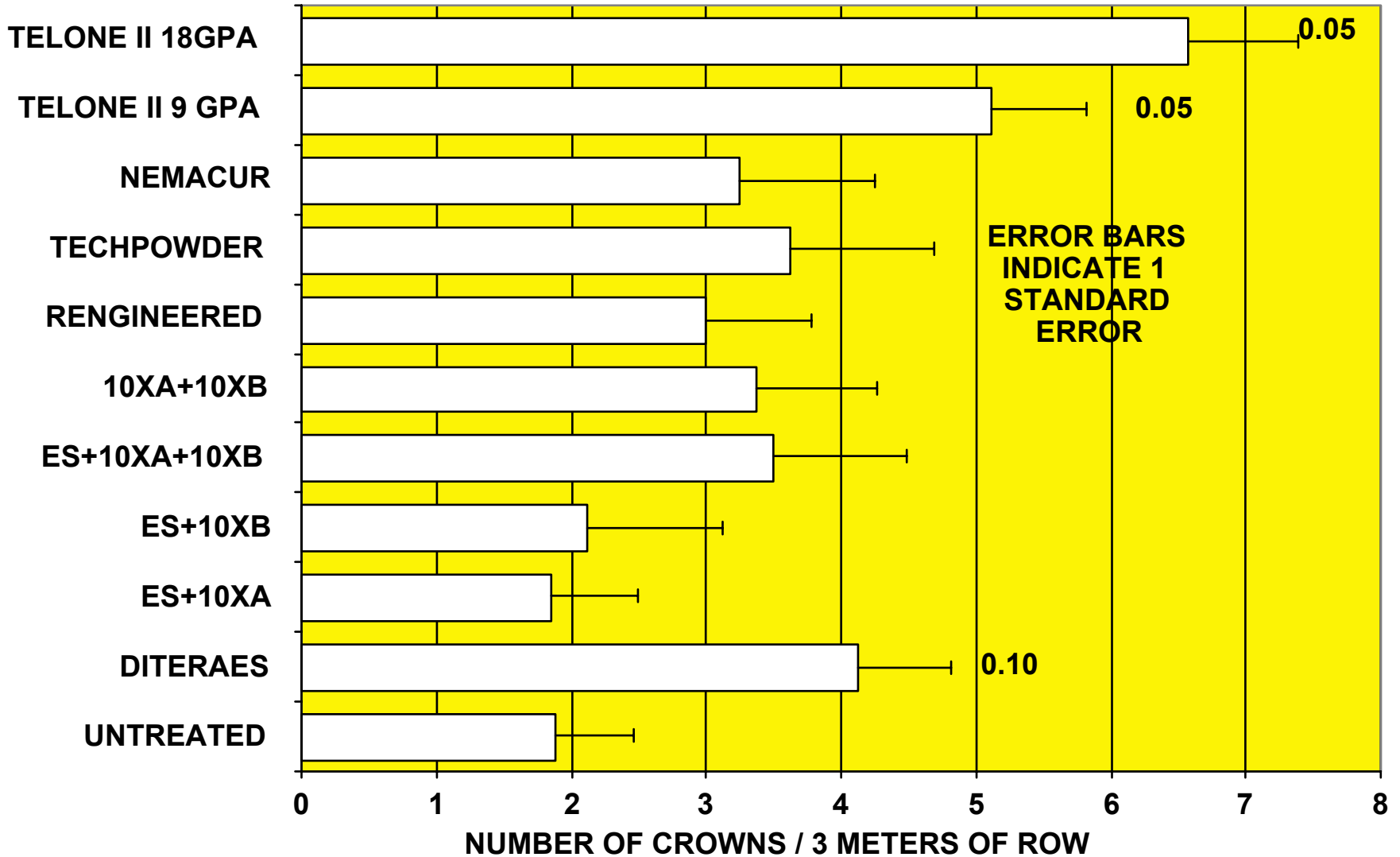
**TOXIN PRODUCED BY A FUNGUS**

**VERY WATER SOLUBLE**

**CA REGISTRATION ON SEVERAL CROPS**



### 1999 SCFS - BROCCOLI - COMMERCIAL CROWNS

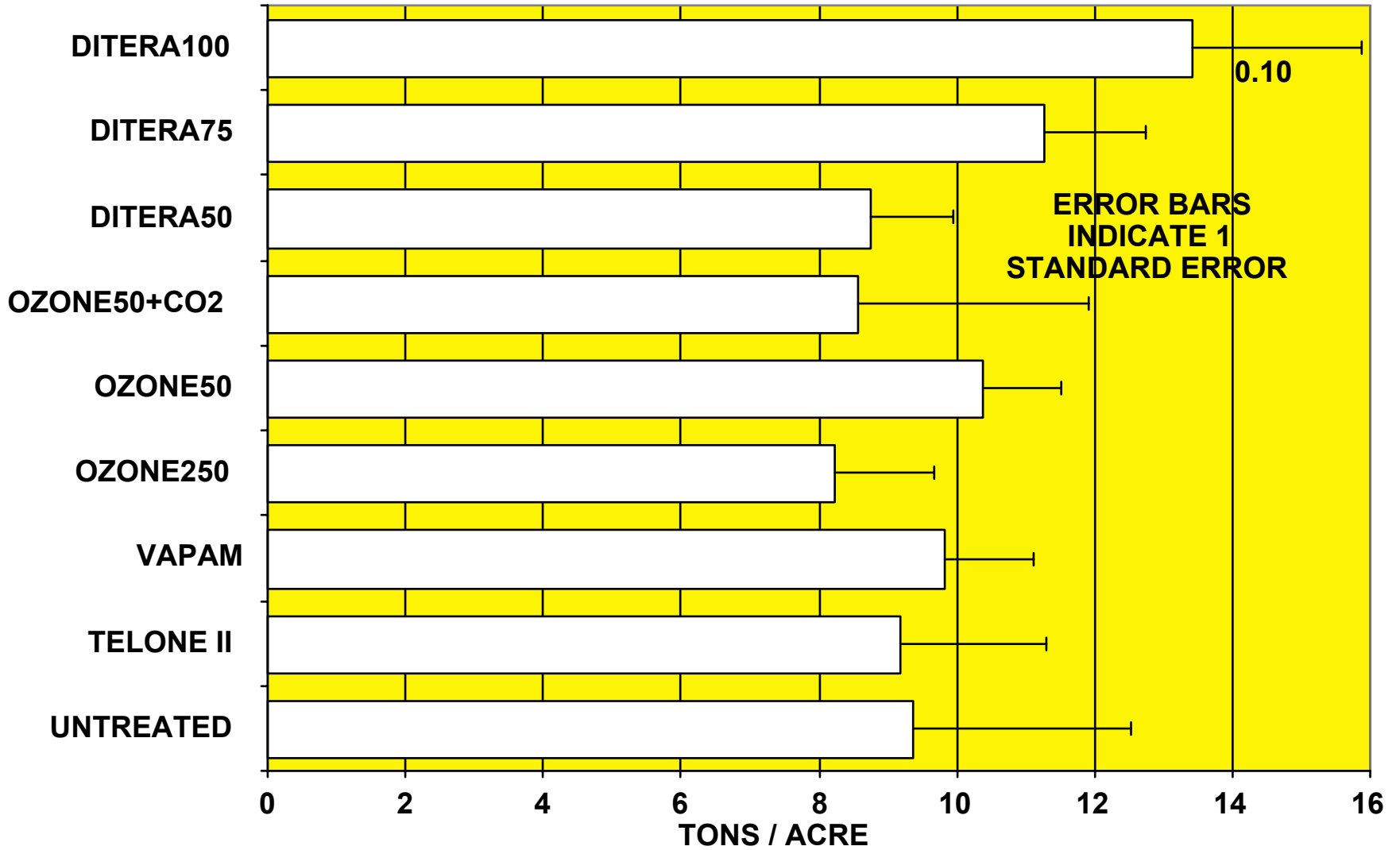




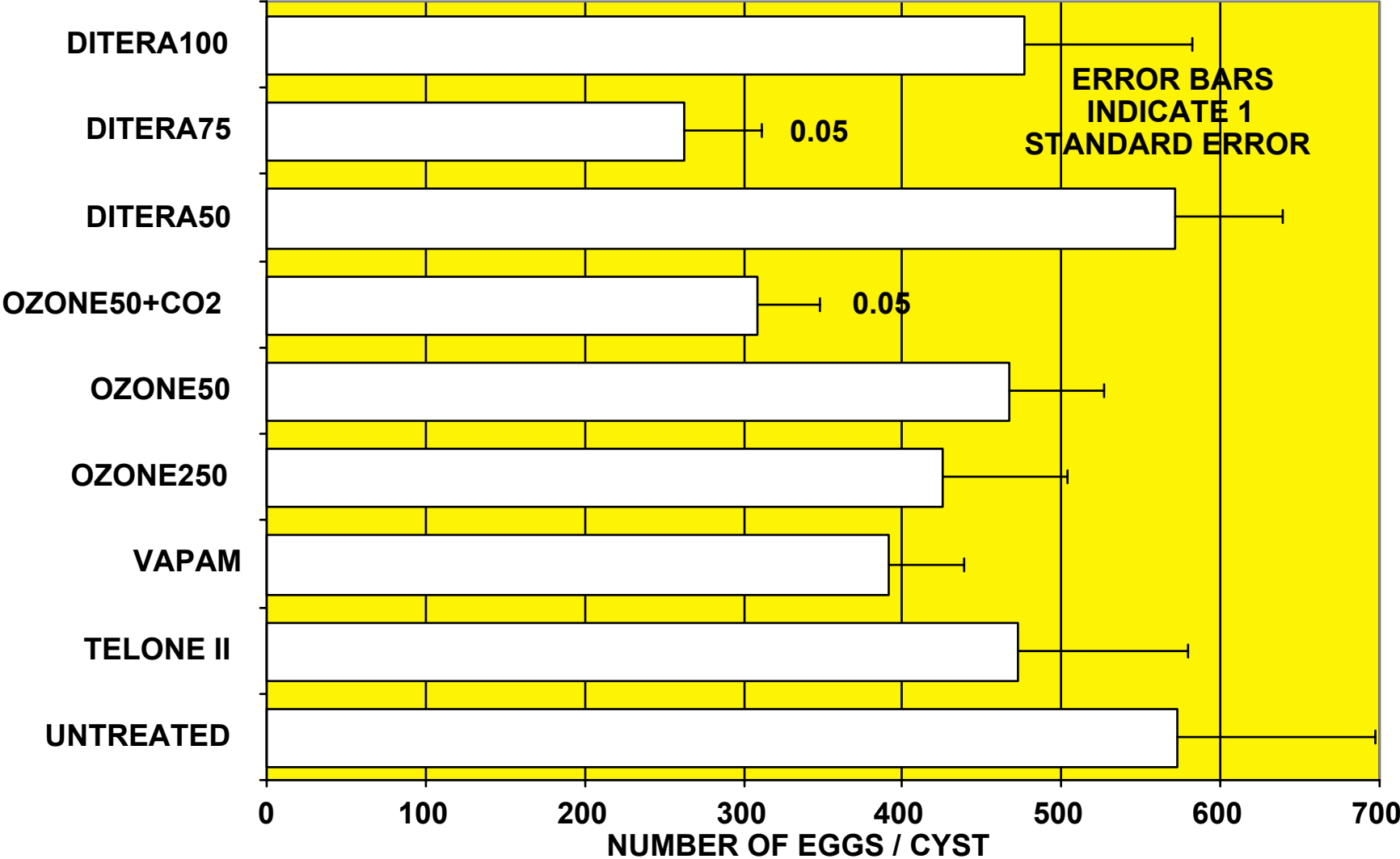
# SUGARBEETS



# 1998 SCFS - SUGARBEETS - YIELD - CYST NEMATODE



**1998 SCFS - SUGARBEETS - EGGS / CYST**





# MUSTARD AND RADISH COVER CROPS

QuickTime™ and a  
to CD Decompressor  
ded to use this picture



# NEMATODE / HOST ASSOCIATION DATABASES

H. FERRIS, E. CASWELL-CHEN, B. WESTERDAHL

FROM URL: <http://ucdnema.ucdavis.edu/>

SELECT: VIEW DATABASES

**NEMABASE Nematode-Host Association Database**

(can also be obtained from ucipm website)

**Nematode Common-Scientific Name Database**

**Plant Common-Scientific Name Database**

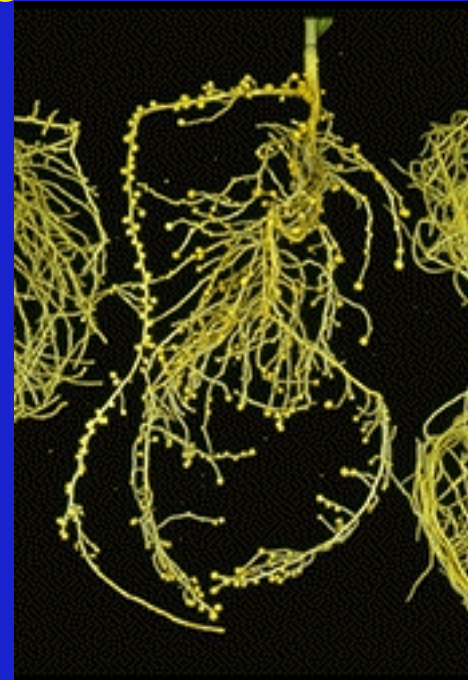
**Lownsbery Nematode-Host Association Database**

**Radewald California Ornamental**

**Nematode-Host Association Database**

**Nematode Primer Database**

**Knowledge Planning Database**

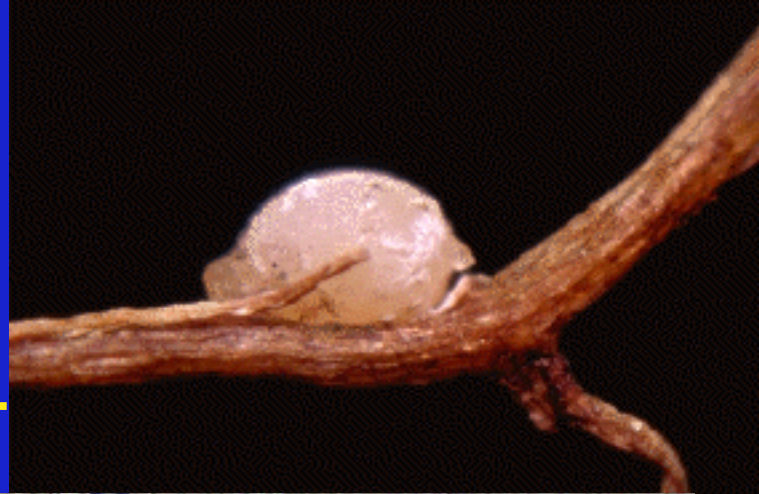


**BIOFUMIGATION (CASWELL-CHEN, WESTERDAHL):  
EVALUATION OF BROCCOLI RESIDUE FOR  
SUGARBEET CYST NEMATODE CONTROL  
BRASSICACEAE PRODUCE GLUCOSINOLATES  
BROCCOLI DEGRADATION RELEASES  
ISOTHIOCYANATES  
METAM SODIUM IS A SYNTHETIC ISOTHIOCYANATE**





**UC SOUTH COAST RESEARCH  
AND EXTENSION CENTER  
SUGARBEET CYST NEMATODE  
(HETERODERA SCHACHTII)  
RANDOMIZED COMPLETE BLOCK  
3-4 REPLICATES PER TREATMENT**



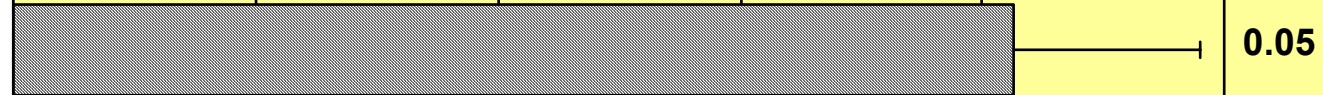




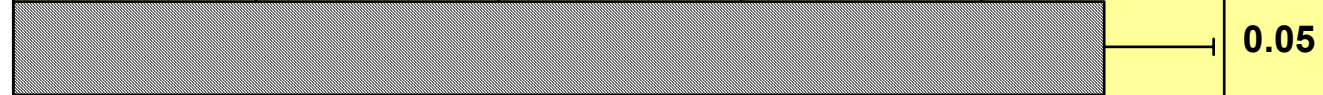


**2000 SCFS BROCCOLI BIOFUMIGATION TRIAL**

**1XTELONE2X**



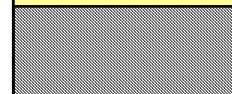
**1XTELONE**



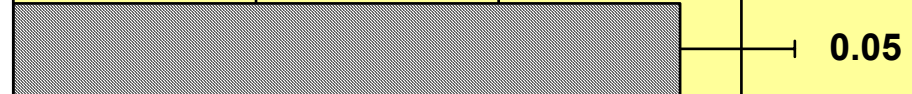
**1XTARP**



**1X**



**2X**



**NONE**



**ERROR BARS  
INDICATE 1  
STANDARD ERROR**

**0 2 4 6 8 10 12**  
**NUMBER OF MARKETABLE CROWNS**



**2000 SCFS BROCCOLI BIOFUMIGATION TRIAL**

**1XTELONE2X**

**1XTELONE**

**1XTARP**

**1X**

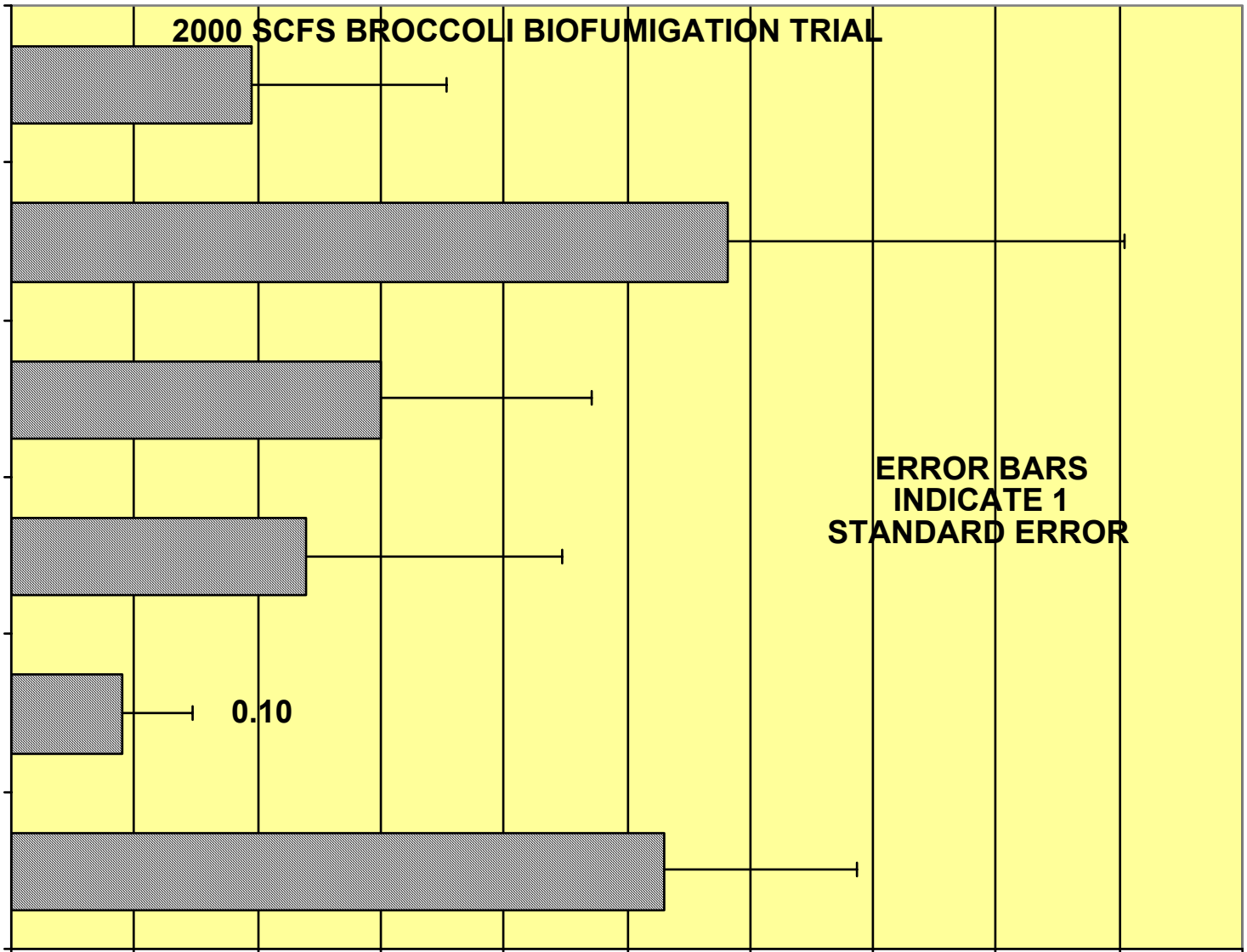
**2X**

**NONE**

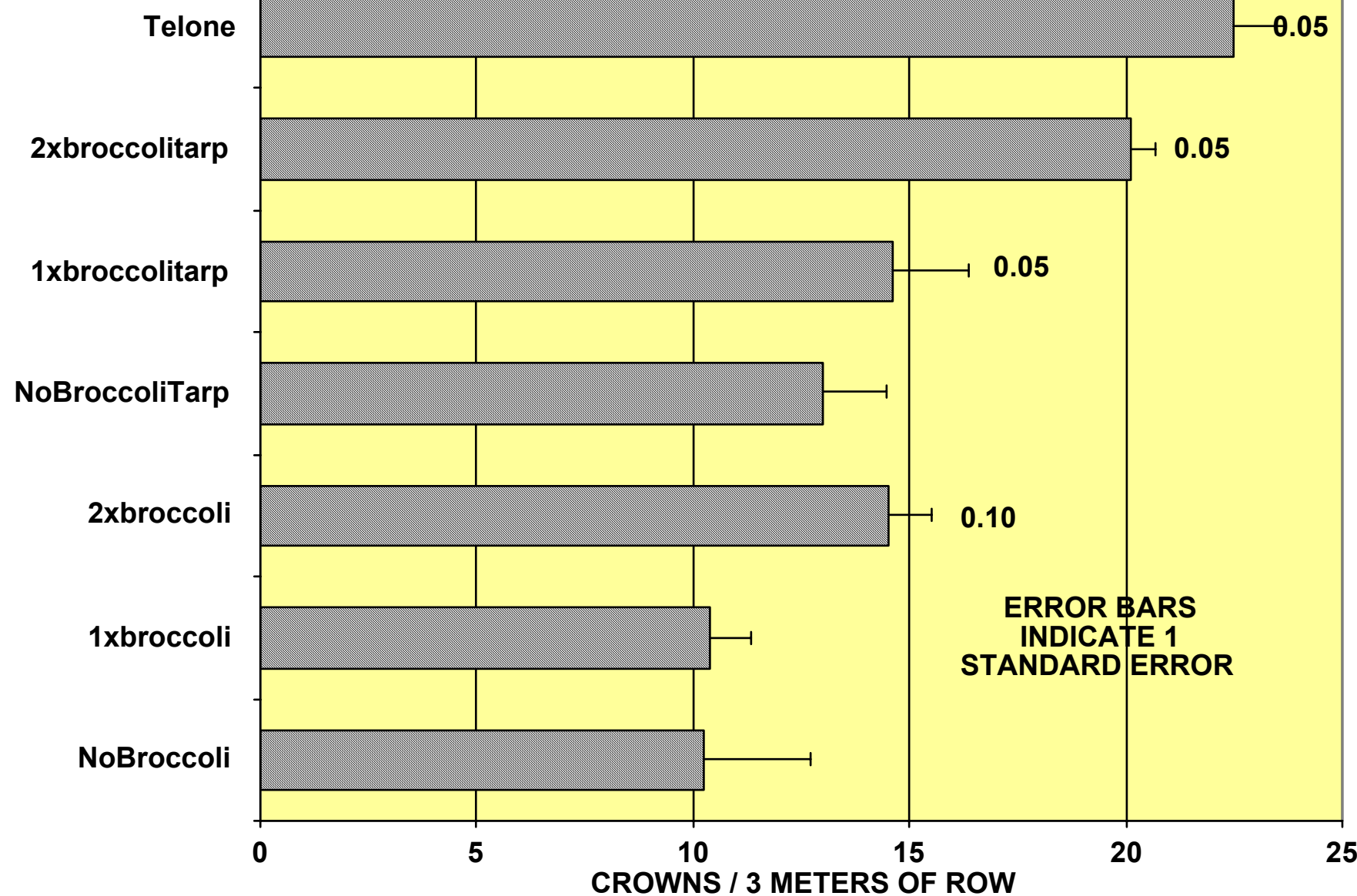
**ERROR BARS  
INDICATE 1  
STANDARD ERROR**

**0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0**  
**EGG HATCH PF/PI**

**0.10**



**2002 SCFS BROCCOLI BIOFUMIGATION TRIAL - COMMERCIAL CROWNS**



**ERROR BARS  
INDICATE 1  
STANDARD ERROR**